

# Cub Creek Energy, LLC

Location	Weld County, CO	Slot	OLANDER 21
Field	WATTENBERG	Well	W OLANDER 21
Installation	Olander Pad	Wellbore	W OLANDER 21 (PWB)

East (Feet) ->

-800 0 800 1600 2400  
Scale 1 cm = 400 ft

N

GRID

## WELL PROFILE DATA

Point	MD	Inc	Azi	TVD	North	East	deg/100ft	V. Sect
Tie on	17.00	0.00	0.00	17.00	S 0.00	W 0.00		0.00
KOP	1200.00	0.00	65.72	1200.00	S 0.00	W 0.00	0.00	0.00
End of Build	1965.20	15.30	65.72	1956.13	N 41.77	E 92.60	2.00	-28.23
End of Hold	6450.64	15.30	65.72	6282.52	N 528.52	E 1171.80	0.00	-357.25
Target OLANDER 21 EP	7412.07	90.00	179.64	6897.82	S 40.17	E 1329.30	10.00	228.01
T.D. & Target OLA...2mi	17090.25	90.00	179.64	6897.82	S 9718.16	E 1390.27	0.00	9817.10

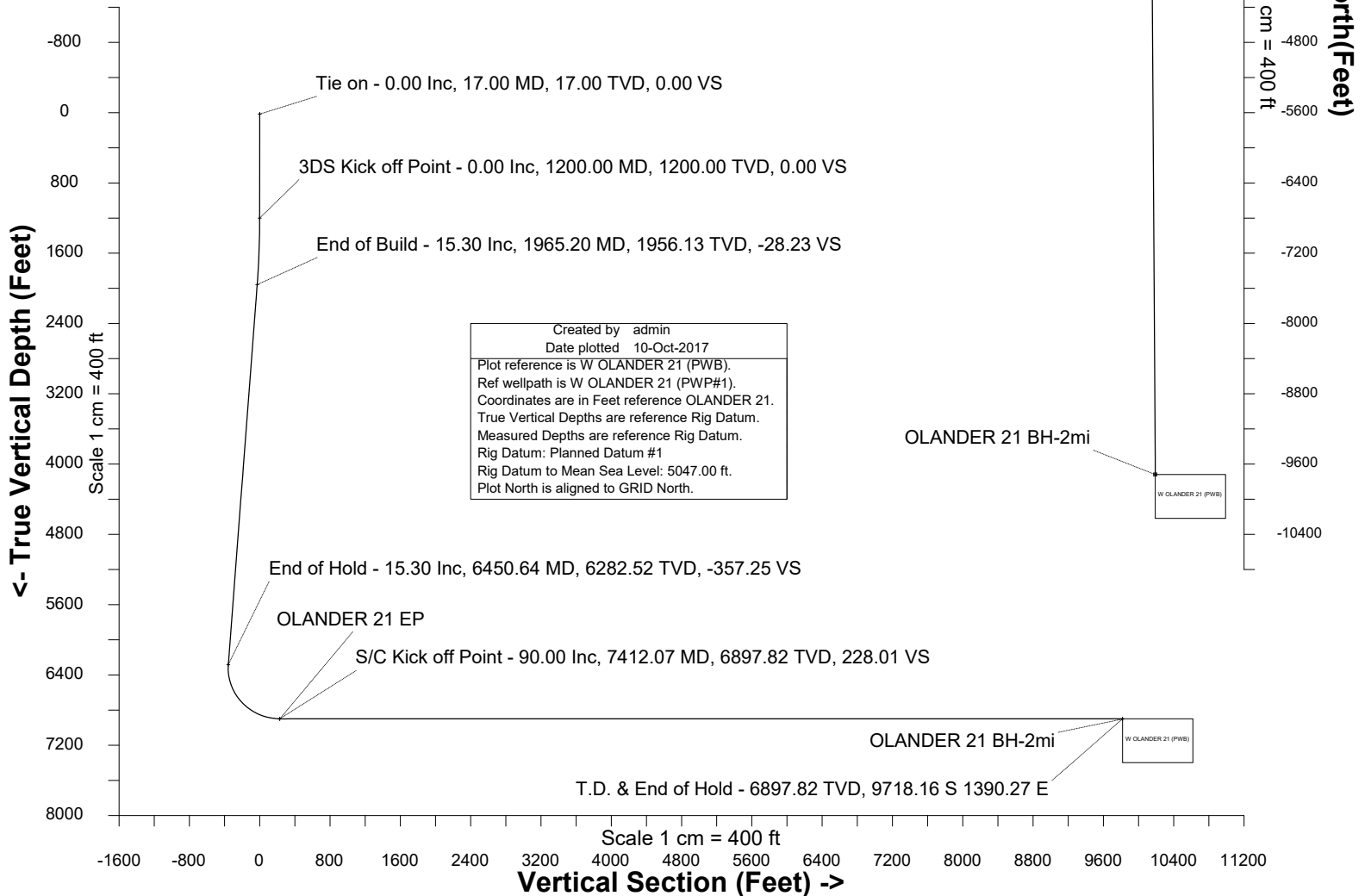
Surface 0.00 N 0.00 E

OLANDER 21 EP

Jul-12-2017  
EMM-2015 (2000.0-2020.0) Dip: 66.61 deg Field: 52203.1 nT  
Lat: N40 12 10.3680 Long: W105 1 31.6200 Elev: 5033.00 ft  
Magnetic North is 8.59 deg East of True North  
GRID North is 0.31 deg East of True North  
To correct azimuth from True to GRID subtract 0.31 deg  
To correct azimuth from Magnetic to GRID add 8.28 deg

<- North(Feet)

Scale 1 cm = 400 ft



Azimuth 171.86 with reference 0.00 N, 0.00 E from OLANDER 21



SYSDRILL  
Well Design Combined Report  
Wellbore: W OLANDER 21 (PWB)



Wellhead Details							
Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
OLANDER 21	40.20281000	-105.02502000	1317081.4171	3132670.9897	24.86S	120.25E	0.00

Declination		
Date	Source	Time
Jul-12-2017	EMM-2015 [2000.0-2020.0]	14:01

Installation Details						
Name	Installation Position (Latitude)	Installation Position (Longitude)	Northing	Easting	Coord System Name	North Alignment
Olander Pad	40.20288000	-105.02545000	1317106.2735	3132550.7471	CO83-NF on NORTH AMERICAN DATUM 1983 datum	Grid

Summary Wellpath									
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Northing	Easting
17.00	0.00	0.000	17.00	0.00N	0.00E		0.00	1317081.42	3132670.99
1200.00	0.00	65.720	1200.00	0.00N	0.00E	==>	0.00	1317081.42	3132670.99
1965.20	15.30	65.720	1956.13	41.77N	92.60E	2.00	-28.23	1317123.18	3132763.59
6450.64	15.30	65.720	6282.52	528.52N	1171.80E	==>	-357.25	1317609.91	3133842.74
7412.07	90.00	179.640	6897.82	40.17S	1329.30E	10.00	228.01	1317041.25	3134000.23
17090.25	90.00	179.640	6897.82	9718.16S	1390.27E	==>	9817.10	1307363.69	3134061.20

Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
0.00	0.00	0.000	0.00	0.00N	0.00E		0.00	Rig Datum
17.00	0.00	0.000	17.00	0.00N	0.00E	==>	0.00	Slot Datum
100.00	0.00	0.000	100.00	0.00N	0.00E	==>	0.00	
200.00	0.00	0.000	200.00	0.00N	0.00E	==>	0.00	
300.00	0.00	0.000	300.00	0.00N	0.00E	==>	0.00	
400.00	0.00	0.000	400.00	0.00N	0.00E	==>	0.00	
500.00	0.00	0.000	500.00	0.00N	0.00E	==>	0.00	
600.00	0.00	0.000	600.00	0.00N	0.00E	==>	0.00	
700.00	0.00	0.000	700.00	0.00N	0.00E	==>	0.00	
800.00	0.00	0.000	800.00	0.00N	0.00E	==>	0.00	
900.00	0.00	0.000	900.00	0.00N	0.00E	==>	0.00	
1000.00	0.00	0.000	1000.00	0.00N	0.00E	==>	0.00	
1100.00	0.00	0.000	1100.00	0.00N	0.00E	==>	0.00	
1200.00	0.00	65.720	1200.00	0.00N	0.00E	==>	0.00	
1300.00	2.00	65.720	1299.98	0.72N	1.59E	2.00	-0.48	
1400.00	4.00	65.720	1399.84	2.87N	6.36E	2.00	-1.94	
1500.00	6.00	65.720	1499.45	6.45N	14.31E	2.00	-4.36	
1517.00	6.34	65.720	1516.35	7.20N	15.97E	2.00	-4.87	
1617.00	8.34	65.720	1615.53	12.46N	27.62E	2.00	-8.42	
1717.00	10.34	65.720	1714.20	19.13N	42.41E	2.00	-12.93	
1817.00	12.34	65.720	1812.24	27.21N	60.33E	2.00	-18.39	
1917.00	14.34	65.720	1909.54	36.70N	81.36E	2.00	-24.81	
2017.00	15.30	65.720	2006.10	47.39N	105.07E	==>	-32.03	
2117.00	15.30	65.720	2102.55	58.24N	129.13E	==>	-39.37	
2217.00	15.30	65.720	2199.00	69.09N	153.19E	==>	-46.70	
2317.00	15.30	65.720	2295.46	79.94N	177.25E	==>	-54.04	
2417.00	15.30	65.720	2391.91	90.80N	201.31E	==>	-61.37	
2517.00	15.30	65.720	2488.37	101.65N	225.37E	==>	-68.71	
2617.00	15.30	65.720	2584.82	112.50N	249.43E	==>	-76.04	
2717.00	15.30	65.720	2681.27	123.35N	273.49E	==>	-83.38	
2817.00	15.30	65.720	2777.73	134.20N	297.55E	==>	-90.71	
2917.00	15.30	65.720	2874.18	145.06N	321.61E	==>	-98.05	
3017.00	15.30	65.720	2970.64	155.91N	345.67E	==>	-105.38	

All data is in Feet unless otherwise stated  
Coordinates are from Slot MD's are from Rig and TVD's are from Rig ( Planned Datum #1 5047.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 171.860 degrees  
Bottom hole distance is 9817.10 Feet on azimuth 171.86 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Microsoft  
Date Printed: 10-Oct-2017



SYSDRILL  
Well Design Combined Report  
Wellbore: W OLANDER 21 (PWB)



Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
3117.00	15.30	65.720	3067.09	166.76N	369.73E	==>	-112.72	
3217.00	15.30	65.720	3163.54	177.61N	393.79E	==>	-120.05	
3317.00	15.30	65.720	3260.00	188.46N	417.85E	==>	-127.39	
3417.00	15.30	65.720	3356.45	199.31N	441.91E	==>	-134.72	
3517.00	15.30	65.720	3452.91	210.17N	465.97E	==>	-142.06	
3617.00	15.30	65.720	3549.36	221.02N	490.03E	==>	-149.39	
3717.00	15.30	65.720	3645.81	231.87N	514.09E	==>	-156.73	
3817.00	15.30	65.720	3742.27	242.72N	538.15E	==>	-164.06	
3917.00	15.30	65.720	3838.72	253.57N	562.21E	==>	-171.40	
4017.00	15.30	65.720	3935.17	264.43N	586.27E	==>	-178.74	
4117.00	15.30	65.720	4031.63	275.28N	610.33E	==>	-186.07	
4217.00	15.30	65.720	4128.08	286.13N	634.39E	==>	-193.41	
4317.00	15.30	65.720	4224.54	296.98N	658.45E	==>	-200.74	
4417.00	15.30	65.720	4320.99	307.83N	682.51E	==>	-208.08	
4517.00	15.30	65.720	4417.44	318.68N	706.57E	==>	-215.41	
4617.00	15.30	65.720	4513.90	329.54N	730.63E	==>	-222.75	
4717.00	15.30	65.720	4610.35	340.39N	754.69E	==>	-230.08	
4817.00	15.30	65.720	4706.81	351.24N	778.75E	==>	-237.42	
4917.00	15.30	65.720	4803.26	362.09N	802.81E	==>	-244.75	
5017.00	15.30	65.720	4899.71	372.94N	826.87E	==>	-252.09	
5117.00	15.30	65.720	4996.17	383.80N	850.93E	==>	-259.42	
5217.00	15.30	65.720	5092.62	394.65N	874.99E	==>	-266.76	
5317.00	15.30	65.720	5189.08	405.50N	899.05E	==>	-274.09	
5417.00	15.30	65.720	5285.53	416.35N	923.11E	==>	-281.43	
5517.00	15.30	65.720	5381.98	427.20N	947.17E	==>	-288.76	
5617.00	15.30	65.720	5478.44	438.05N	971.23E	==>	-296.10	
5717.00	15.30	65.720	5574.89	448.91N	995.29E	==>	-303.43	
5817.00	15.30	65.720	5671.35	459.76N	1019.35E	==>	-310.77	
5917.00	15.30	65.720	5767.80	470.61N	1043.41E	==>	-318.10	
6017.00	15.30	65.720	5864.25	481.46N	1067.47E	==>	-325.44	
6117.00	15.30	65.720	5960.71	492.31N	1091.53E	==>	-332.77	
6217.00	15.30	65.720	6057.16	503.17N	1115.59E	==>	-340.11	
6317.00	15.30	65.720	6153.61	514.02N	1139.65E	==>	-347.44	
6417.00	15.30	65.720	6250.07	524.87N	1163.71E	==>	-354.78	
6517.00	14.05	91.670	6346.78	531.89N	1187.85E	10.00	-358.31	
6617.00	17.47	126.990	6443.22	522.48N	1212.04E	10.00	-345.57	
6717.00	24.67	146.640	6536.59	495.95N	1235.56E	10.00	-315.98	
6817.00	33.29	157.240	6624.04	453.10N	1257.71E	10.00	-270.42	
6917.00	42.46	163.770	6702.93	395.24N	1277.81E	10.00	-210.30	
7017.00	51.89	168.320	6770.84	324.12N	1295.24E	10.00	-137.43	
7117.00	61.46	171.820	6825.73	241.91N	1309.49E	10.00	-54.03	
7217.00	71.10	174.730	6865.92	151.10N	1320.12E	10.00	37.37	
7317.00	80.78	177.310	6890.19	54.45N	1326.80E	10.00	134.00	
7417.00	90.00	179.640	6897.82	45.10S	1329.33E	==>	232.90	
7517.00	90.00	179.640	6897.82	145.10S	1329.96E	==>	331.98	
7617.00	90.00	179.640	6897.82	245.10S	1330.59E	==>	431.06	
7717.00	90.00	179.640	6897.82	345.09S	1331.22E	==>	530.14	
7817.00	90.00	179.640	6897.82	445.09S	1331.85E	==>	629.22	
7917.00	90.00	179.640	6897.82	545.09S	1332.48E	==>	728.30	
8017.00	90.00	179.640	6897.82	645.09S	1333.11E	==>	827.38	
8117.00	90.00	179.640	6897.82	745.09S	1333.74E	==>	926.46	
8217.00	90.00	179.640	6897.82	845.08S	1334.37E	==>	1025.54	
8317.00	90.00	179.640	6897.82	945.08S	1335.00E	==>	1124.62	
8417.00	90.00	179.640	6897.82	1045.08S	1335.63E	==>	1223.70	
8517.00	90.00	179.640	6897.82	1145.08S	1336.26E	==>	1322.78	
8617.00	90.00	179.640	6897.82	1245.08S	1336.89E	==>	1421.85	
8717.00	90.00	179.640	6897.82	1345.07S	1337.52E	==>	1520.93	
8817.00	90.00	179.640	6897.82	1445.07S	1338.15E	==>	1620.01	
8917.00	90.00	179.640	6897.82	1545.07S	1338.78E	==>	1719.09	

All data is in Feet unless otherwise stated  
Coordinates are from Slot MD's are from Rig and TVD's are from Rig ( Planned Datum #1 5047.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 171.860 degrees  
Bottom hole distance is 9817.10 Feet on azimuth 171.86 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Microsoft  
Date Printed: 10-Oct-2017

Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
9017.00	90.00	179.640	6897.82	1645.07S	1339.41E	==>	1818.17	
9117.00	90.00	179.640	6897.82	1745.07S	1340.04E	==>	1917.25	
9217.00	90.00	179.640	6897.82	1845.06S	1340.67E	==>	2016.33	
9317.00	90.00	179.640	6897.82	1945.06S	1341.30E	==>	2115.41	
9417.00	90.00	179.640	6897.82	2045.06S	1341.93E	==>	2214.49	
9517.00	90.00	179.640	6897.82	2145.06S	1342.56E	==>	2313.57	
9617.00	90.00	179.640	6897.82	2245.06S	1343.19E	==>	2412.65	
9717.00	90.00	179.640	6897.82	2345.05S	1343.82E	==>	2511.73	
9817.00	90.00	179.640	6897.82	2445.05S	1344.45E	==>	2610.81	
9917.00	90.00	179.640	6897.82	2545.05S	1345.08E	==>	2709.89	
10017.00	90.00	179.640	6897.82	2645.05S	1345.71E	==>	2808.97	
10117.00	90.00	179.640	6897.82	2745.05S	1346.34E	==>	2908.05	
10217.00	90.00	179.640	6897.82	2845.04S	1346.97E	==>	3007.12	
10317.00	90.00	179.640	6897.82	2945.04S	1347.60E	==>	3106.20	
10417.00	90.00	179.640	6897.82	3045.04S	1348.23E	==>	3205.28	
10517.00	90.00	179.640	6897.82	3145.04S	1348.86E	==>	3304.36	
10617.00	90.00	179.640	6897.82	3245.04S	1349.49E	==>	3403.44	
10717.00	90.00	179.640	6897.82	3345.03S	1350.12E	==>	3502.52	
10817.00	90.00	179.640	6897.82	3445.03S	1350.75E	==>	3601.60	
10917.00	90.00	179.640	6897.82	3545.03S	1351.38E	==>	3700.68	
11017.00	90.00	179.640	6897.82	3645.03S	1352.01E	==>	3799.76	
11117.00	90.00	179.640	6897.82	3745.03S	1352.64E	==>	3898.84	
11217.00	90.00	179.640	6897.82	3845.02S	1353.27E	==>	3997.92	
11317.00	90.00	179.640	6897.82	3945.02S	1353.90E	==>	4097.00	
11417.00	90.00	179.640	6897.82	4045.02S	1354.53E	==>	4196.08	
11517.00	90.00	179.640	6897.82	4145.02S	1355.16E	==>	4295.16	
11617.00	90.00	179.640	6897.82	4245.02S	1355.79E	==>	4394.24	
11717.00	90.00	179.640	6897.82	4345.01S	1356.42E	==>	4493.32	
11817.00	90.00	179.640	6897.82	4445.01S	1357.05E	==>	4592.40	
11917.00	90.00	179.640	6897.82	4545.01S	1357.68E	==>	4691.47	
12017.00	90.00	179.640	6897.82	4645.01S	1358.31E	==>	4790.55	
12117.00	90.00	179.640	6897.82	4745.01S	1358.94E	==>	4889.63	
12217.00	90.00	179.640	6897.82	4845.00S	1359.57E	==>	4988.71	
12317.00	90.00	179.640	6897.82	4945.00S	1360.20E	==>	5087.79	
12417.00	90.00	179.640	6897.82	5045.00S	1360.83E	==>	5186.87	
12517.00	90.00	179.640	6897.82	5145.00S	1361.46E	==>	5285.95	
12617.00	90.00	179.640	6897.82	5245.00S	1362.09E	==>	5385.03	
12717.00	90.00	179.640	6897.82	5344.99S	1362.72E	==>	5484.11	
12817.00	90.00	179.640	6897.82	5444.99S	1363.35E	==>	5583.19	
12917.00	90.00	179.640	6897.82	5544.99S	1363.98E	==>	5682.27	
13017.00	90.00	179.640	6897.82	5644.99S	1364.61E	==>	5781.35	
13117.00	90.00	179.640	6897.82	5744.99S	1365.24E	==>	5880.43	
13217.00	90.00	179.640	6897.82	5844.98S	1365.87E	==>	5979.51	
13317.00	90.00	179.640	6897.82	5944.98S	1366.50E	==>	6078.59	
13417.00	90.00	179.640	6897.82	6044.98S	1367.13E	==>	6177.67	
13517.00	90.00	179.640	6897.82	6144.98S	1367.76E	==>	6276.74	
13617.00	90.00	179.640	6897.82	6244.98S	1368.39E	==>	6375.82	
13717.00	90.00	179.640	6897.82	6344.97S	1369.02E	==>	6474.90	
13817.00	90.00	179.640	6897.82	6444.97S	1369.65E	==>	6573.98	
13917.00	90.00	179.640	6897.82	6544.97S	1370.28E	==>	6673.06	
14017.00	90.00	179.640	6897.82	6644.97S	1370.91E	==>	6772.14	
14117.00	90.00	179.640	6897.82	6744.97S	1371.54E	==>	6871.22	
14217.00	90.00	179.640	6897.82	6844.97S	1372.17E	==>	6970.30	
14317.00	90.00	179.640	6897.82	6944.96S	1372.80E	==>	7069.38	
14417.00	90.00	179.640	6897.82	7044.96S	1373.43E	==>	7168.46	
14517.00	90.00	179.640	6897.82	7144.96S	1374.06E	==>	7267.54	
14617.00	90.00	179.640	6897.82	7244.96S	1374.69E	==>	7366.62	
14717.00	90.00	179.640	6897.82	7344.96S	1375.32E	==>	7465.70	
14817.00	90.00	179.640	6897.82	7444.95S	1375.95E	==>	7564.78	

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Coordinates are from Slot MD's are from Rig and TVD's are from Rig ( Planned Datum #1 5047.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 171.860 degrees  
Bottom hole distance is 9817.10 Feet on azimuth 171.86 degrees from Wellhead  
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Prepared by Microsoft  
Date Printed: 10-Oct-2017



SYS DRILL  
Well Design Combined Report  
Wellbore: W OLANDER 21 (PWB)



Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
14917.00	90.00	179.640	6897.82	7544.95S	1376.58E	==>	7663.86	
15017.00	90.00	179.640	6897.82	7644.95S	1377.21E	==>	7762.94	
15117.00	90.00	179.640	6897.82	7744.95S	1377.84E	==>	7862.02	
15217.00	90.00	179.640	6897.82	7844.95S	1378.47E	==>	7961.09	
15317.00	90.00	179.640	6897.82	7944.94S	1379.10E	==>	8060.17	
15417.00	90.00	179.640	6897.82	8044.94S	1379.73E	==>	8159.25	
15517.00	90.00	179.640	6897.82	8144.94S	1380.36E	==>	8258.33	
15617.00	90.00	179.640	6897.82	8244.94S	1380.99E	==>	8357.41	
15717.00	90.00	179.640	6897.82	8344.94S	1381.62E	==>	8456.49	
15817.00	90.00	179.640	6897.82	8444.93S	1382.25E	==>	8555.57	
15917.00	90.00	179.640	6897.82	8544.93S	1382.88E	==>	8654.65	
16017.00	90.00	179.640	6897.82	8644.93S	1383.51E	==>	8753.73	
16117.00	90.00	179.640	6897.82	8744.93S	1384.14E	==>	8852.81	
16217.00	90.00	179.640	6897.82	8844.93S	1384.77E	==>	8951.89	
16317.00	90.00	179.640	6897.82	8944.92S	1385.40E	==>	9050.97	
16417.00	90.00	179.640	6897.82	9044.92S	1386.03E	==>	9150.05	
16517.00	90.00	179.640	6897.82	9144.92S	1386.66E	==>	9249.13	
16617.00	90.00	179.640	6897.82	9244.92S	1387.29E	==>	9348.21	
16717.00	90.00	179.640	6897.82	9344.92S	1387.92E	==>	9447.29	
16817.00	90.00	179.640	6897.82	9444.91S	1388.55E	==>	9546.37	
16917.00	90.00	179.640	6897.82	9544.91S	1389.18E	==>	9645.44	
17017.00	90.00	179.640	6897.82	9644.91S	1389.81E	==>	9744.52	
17090.25	90.00	179.640	6897.82	9718.16S	1390.27E	==>	9817.10	

All data is in Feet unless otherwise stated  
Coordinates are from Slot MD's are from Rig ( Planned Datum #1 5047.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 171.860 degrees  
Bottom hole distance is 9817.10 Feet on azimuth 171.86 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Microsoft  
Date Printed: 10-Oct-2017



SYSDRILL  
Well Design Combined Report  
Wellbore: W OLANDER 21 (PWB)



Targets							
Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting
OLANDER 21 EP	40.17S	1329.30E	6897.82	40.20268010	-105.02026200	1317041.25	3134000.23
OLANDER 21 BH-2mi	9718.16S	1390.27E	6897.82	40.17611350	-105.02023120	1307363.69	3134061.20

Survey Tool Program						
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model	
562566	Planned	1517.00	1516.35	WdW Rate Gyro	Standard	
562565	Planned	17090.25	6897.82	ISCWSA MWD	Rev 4 + SAG + FLT	

Notes